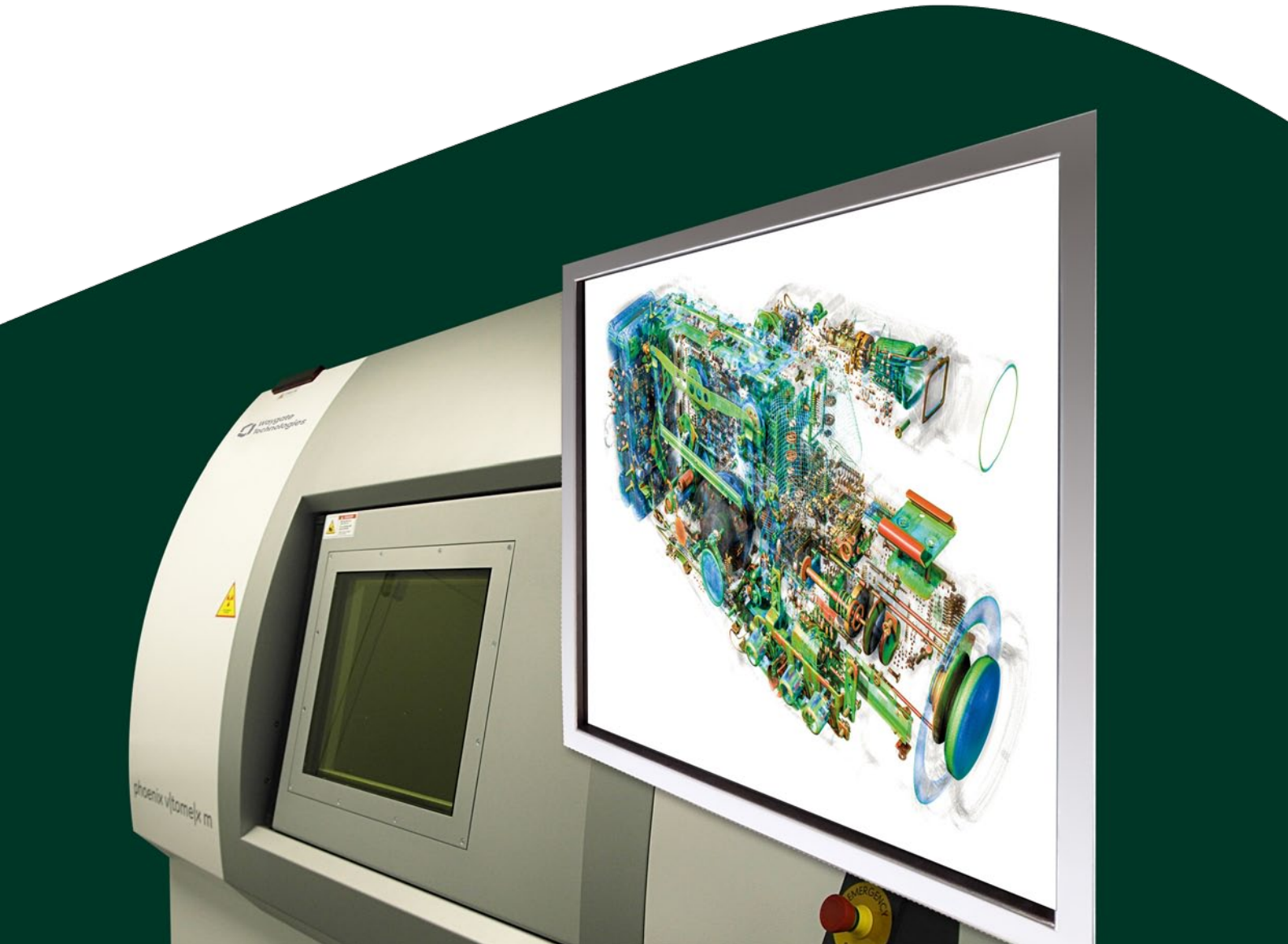
Waygate Technologies
a Baker Hughes business

Industrial Computed Tomography Innovations

Premium performance
for premium CT quality and speed



Premium CT technologies. Faster than ever before.

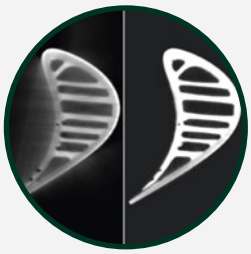
Every industrial CT user wants reproducible 3D product information, and everyone wants that information as fast and as accurate as possible.

We are making that dream a reality by leveraging our exclusive innovations to create premium CT solutions that reduce overall inspection times from hours to just minutes—all without compromising the quality of the results.

So you can meet your specific inspection needs while boosting your productivity and your efficiency.

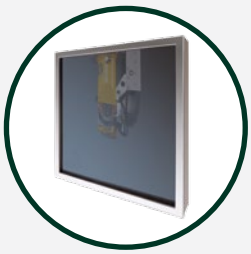
- **Exclusive innovations**
- **More precise inspections**
- **Fully automated workflows**
- **Lower operational costs**

The revolutionary Phoenix V|tome|x M combines a unique bundle of innovations to dramatically increase inspection throughput and quality.

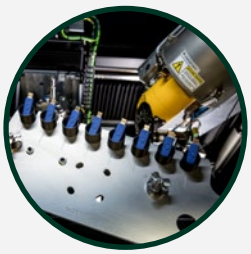


Scatter|correct

Filter|changer

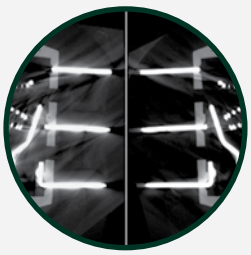


Dynamic 41 digital detector

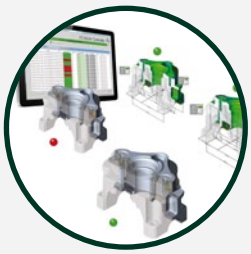


Sample|changer

High-flux|target



Multi|bhc



3D Speed|ADR

Ruby|plate True|position

Production|edition collaborative robot

Unmistakable precision. Unprecedented speed.

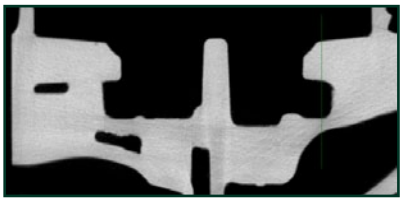
State-of-the-art fan beam CT scans take hours. Our exclusive Scatter|correct, Dynamic 41 digital detector, and High-flux|target reduce scanning time to just 1.5 minutes.

Scatter|correct 2.0

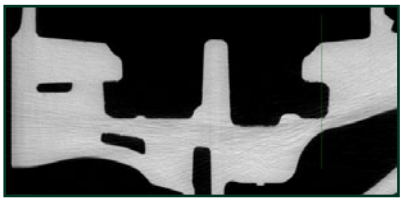
Reduce scan time from 60 minutes to just 6 with artifact-free precision.

For decades, scanning took hours because applying extremely slow fan beam CT was the only way to reduce scatter radiation without reducing quality. But now, with the patented Scatter|correct technology, you can scan large sample batches much faster—without compromising quality. This unique functionality combines the low-artifact, high precision performance of fan beam CT with the increased speed of cone beam CT to improve the precision of failure analysis and 3D metrology inspection tasks with up to 100 times higher throughput.

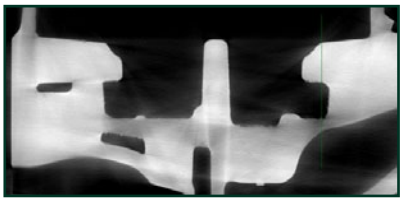
Additionally, in combination with Scatter|correct, Waygate Technologies brand new adaptive Scatter correct ASC|filter is significantly reducing artifacts caused by reduced grey values.



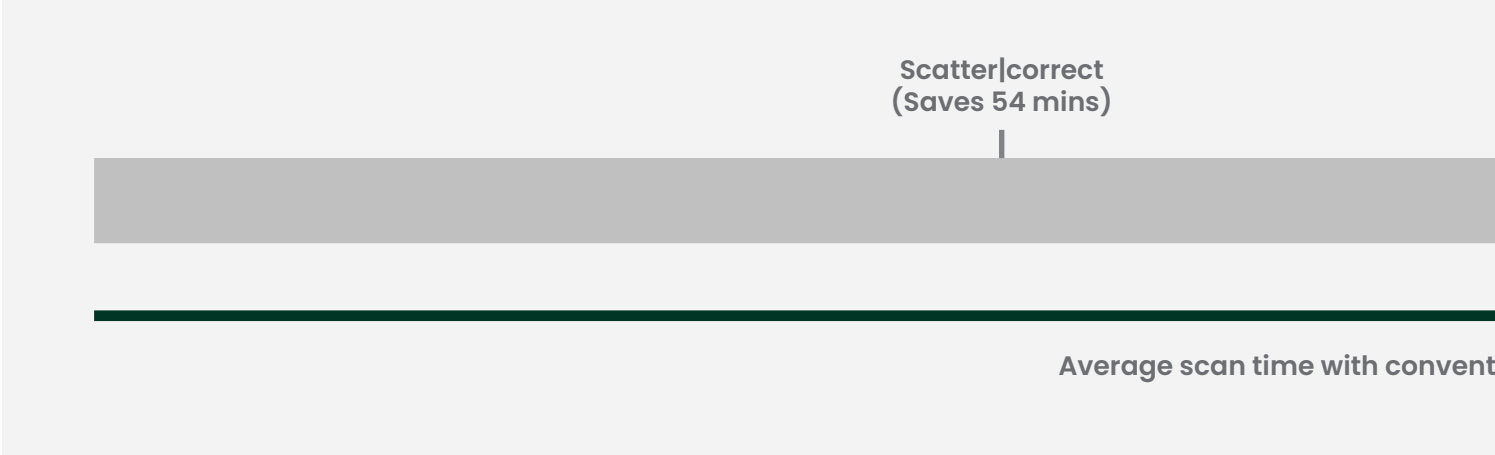
Conventional fan beam CT
2 hrs. scan time



Scatter|correct optimized
9 min. scan time



Conventional cone beam CT
9 min. scan time

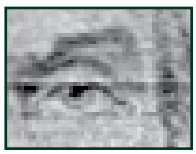


Dynamic 41 digital detector

Reduce scan time from 6 minutes to 3 with increased detector sensitivity.

The Dynamic 41|100 and Dynamic 41|200 detectors are the first in Waygate Technologies exclusive next-generation industrial X-ray flat panel detector platform. They combine increased detector sensitivity, faster frame rates, a larger imaging area, and adaptive imaging modes to help make 2D radiographic and 3D CT inspections more efficient and productive.

Dynamic 41|100 detector

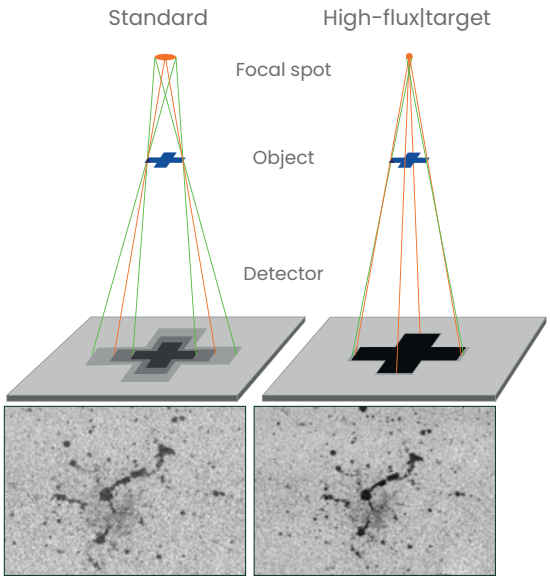


Conventional DXR250 200 µm pixel detector

High-flux|target

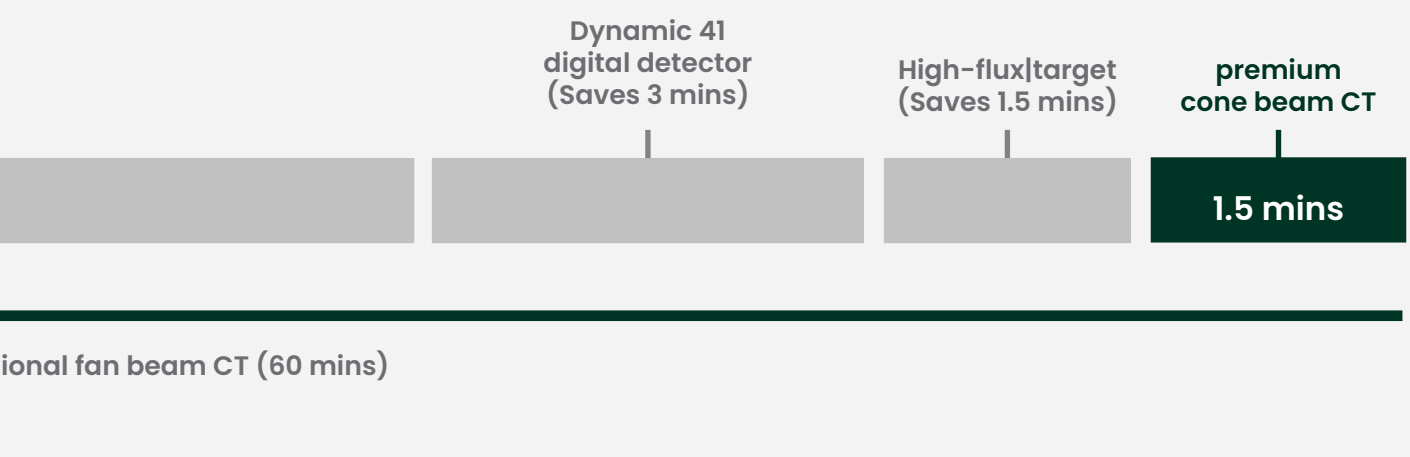
Reduce scan time yet again to just 1.5 minutes with doubled CT speed or resolution.

Throughput-optimized, high-power CT scans once required larger focal spots to prevent the target material from melting. But a larger focal spot meant lower image sharpness—and precision. The High-flux|target, with optimized thermal conductivity, allows for higher power on a smaller focal spot for up to 2 times throughput at the same high resolution. It provides better CT quality with less image noise to improve speed or accuracy.



Standard target 50W

High-flux|target 100W

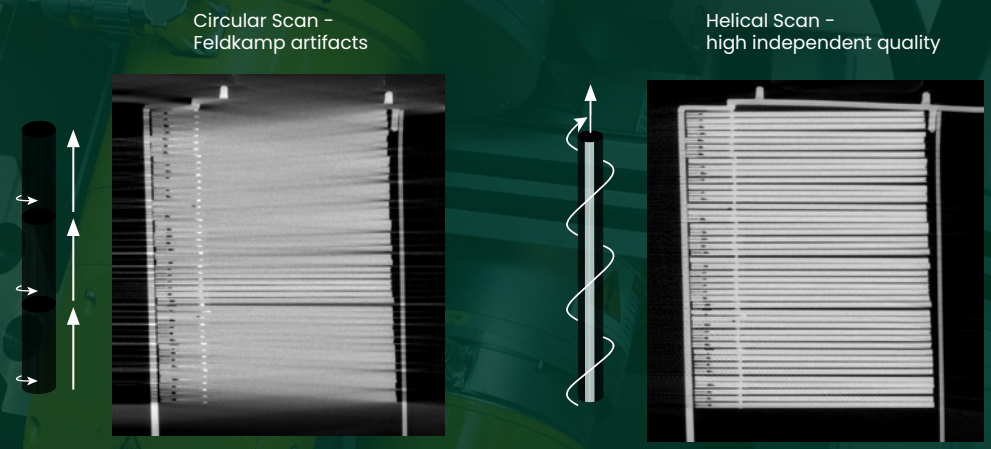


Continuing the innovation.

Our latest innovations help you get the most out of your CT systems by enabling you to scan larger parts with even greater speed and accuracy.

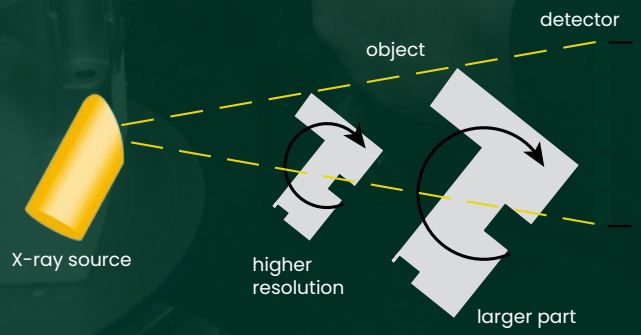
Helix|CT

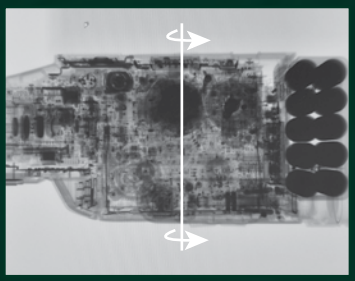
Scan longer parts faster, and with better quality. This acquisition technique reduces artifacts observed in Feldkamp reconstructions, enabling better results on horizontal surfaces and preventing stitching artifacts at the same high magnification. Helical sample rotation scans capture the upper and lower sections of a sample to provide a clearer image, eliminating the need to combine the results of several partial scans and stitch them together afterwards.



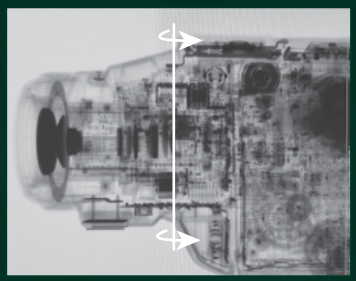
Offset|CT

Scan larger parts more accurately. Until now, compact CT systems with larger 16" detectors, like the Phoenix V|tome|x M and Phoenix V|tome|x C HS, were not able to scan parts that exceeded a certain diameter. But with the new Offset|CT, these compact CT systems have smaller footprints and can scan bigger parts than ever before, or the same size parts with higher resolution.

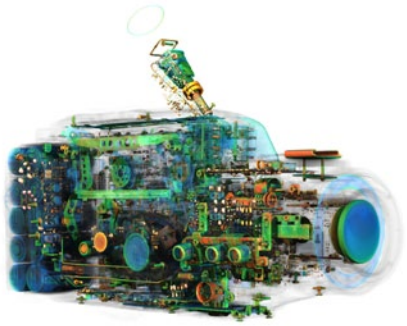




Conventional mid rotation CT scan: Sample is too large even for a 16" detector

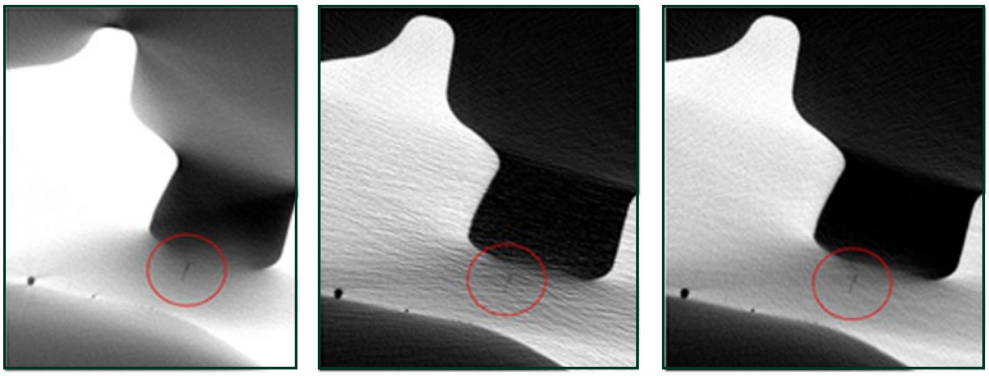


Offset|CT scan: Sample can be scanned even with much higher resolution



ASC|filter
Adaptive Scatter Correct Filter

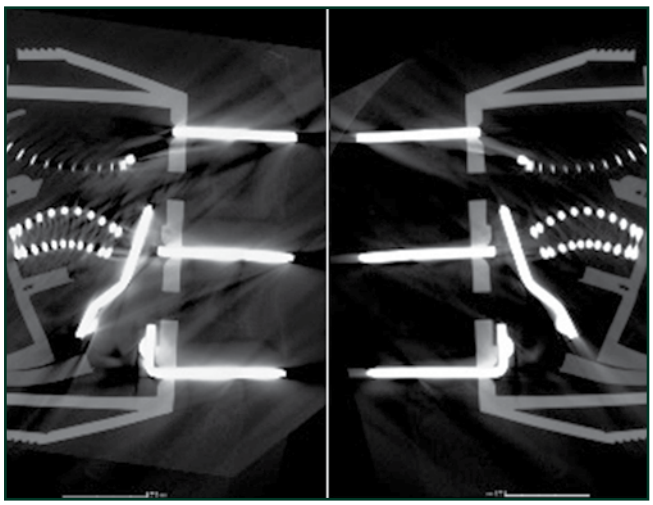
The brand new ASC|filter bring Waygate Technologies patented Scatter|correct technology to the next level, offering unrivaled image quality by significantly reducing artefacts caused by reduced grey values. This filter technology is explicitly beneficial for optimal CT image quality when medium to high absorbing samples are being scanned. The ASC|filter reduces noise grey value to save details during the smoothing. By eliminating this low value streaking, it optimizes data sets created with Scatter|correct technology, enabling fast, easy and reproducible CT data evaluation. This unique functionality is available for all Phoenix V|tome|x systems in combination with Scatter|correct.



State of the art results | Scatter|correct Technology | Scatter|correct Technology boosted by ASC|filter

Multi|bhc
Multi-Material Beam Hardening Correction

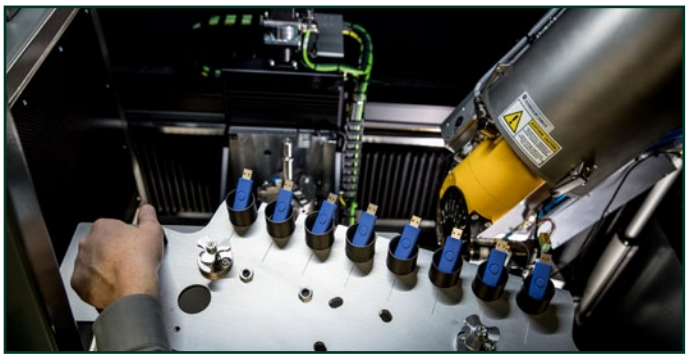
Waygate Technologies innovative Multi|bhc tool corrects streaking artifacts which typically occur as multiple dark streaking bands positioned between dense areas in multi-material samples, e.g. metal parts in assemblies blocking most X-rays. The advanced new reconstruction algorithm significantly reduces streaks which can not be removed with other state of the art techniques. Areas hidden in the CT image due to overlapping streaks, are getting visible and accessible for reliable CT evaluation.



Without Multi|bhc correction | With Multi|bhc correction

Automation meets accuracy.

The future is now, and it's fast. Our industrial CT portfolio provides the ease of use, repeatability, and reproducibility you need to reduce scrap caused by defects and ensure productivity and quality. With highly automated systems you minimize the human factor and ensure up to 100% production control.



Sample|changer

This easily removable holder allows automatic change of different samples, e.g. for longterm overnight batch CT scans in 24/7 operation mode. The manipulation system will automatically pick the caps filled with the samples, lift them and moves each part into the inspection area. Depending on the part size and the suitable sample caps the trays will be able to hold 4 to 10 sample caps. This option helps to dramatically increase scan output while reducing operation costs due to unmanned overnight operation.

Filter|changer

In combination with the Sample|changer, the optional Filter|changer allows to perform batch CT scans even of samples differing in size and material with highest quality due to automated selection of the optimal filter. When programming batch CT scans, the operator can easily choose between 4 filters at Phoenix V|tome|x C and up to 10 for Phoenix V|tome|x M.

Speed|scan HD:
Best in class ADR and fully automated workflows for cutting-edge inline microCT inspection and metrology

Quick|pick manipulator

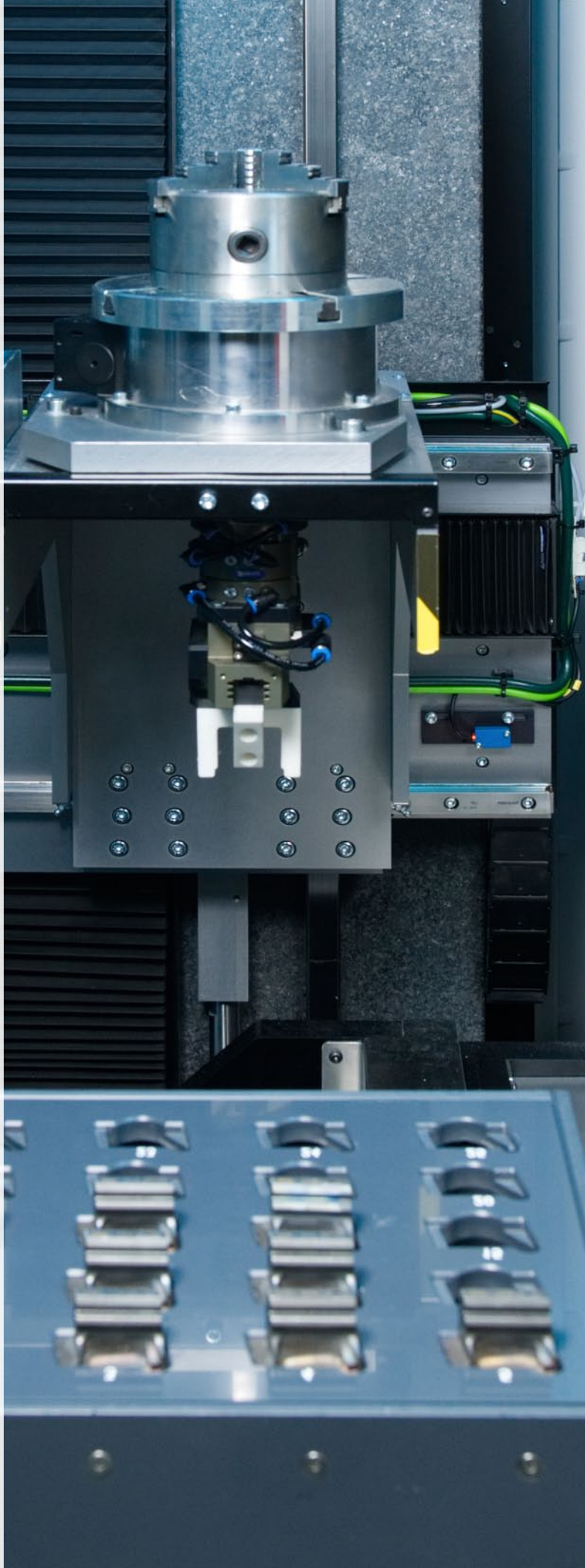
This optional manipulator for automated blade inspection allows fully automated CT evaluation of large batches with the Phoenix V|tome|x C HS. It offers industry-leading sample size, flexibility, and maximum penetration power for high-absorbing samples.

Production|edition collaborative robot

An optional collaborative robot make the Phoenix V|tome|x scanners an efficient 3D inspection tool—offering fully automated high-throughput CT inspection.

3D Speed|ADR

For automated defect recognition. Available exclusively for the groundbreaking Speed|scan CT64, the powerful Speed|ADR algorithms combine with the leading VGinLINE software by Volume Graphics to deliver up to 100% 3D production process control and optimization.



Metrology 2.0

Reliable Measurements with Insight.

Waygate Technologies new True|position and Ruby|plate technologies bring CT metrology workflows and precision referring to VDI 2630 guidelines to a new level.

These features work together to allow users to quickly and easily determine the system's geometry at any point, ensuring the ability to automatically correct any deviations and maintain conformance with VDI 2630 measurements.
This means faster setup times for CT scans with higher measurement accuracy.

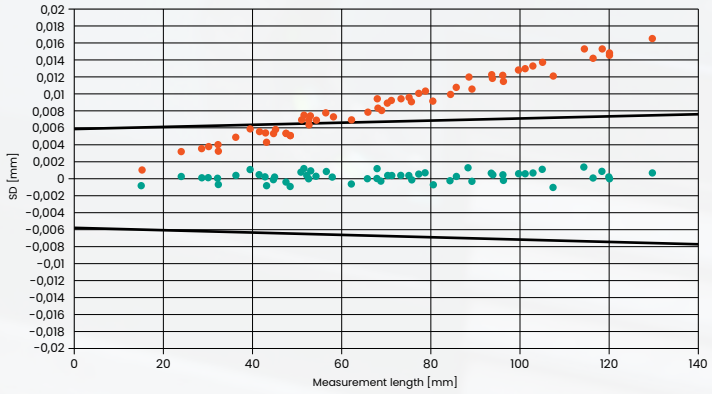
Ruby|plate

The patented Ruby|plate allows a 3x faster automated verification of the specified measurement accuracy (SD) according to VDI 2630 1.3 (compared to current technology): All directions and length required by the guideline are covered by its ruby spheres alignment on ceramic plat in just one scan.

True|position

- Advanced method for compensation of residual system mechanical uncertainties. This allows users of the Phoenix V|tome|x M system measurements with specified accuracy at all positions.
- Expands the measurement positions with specified accuracy to all positions which allows a faster setup of CT scans with high measurement accuracy.
- New VDI 2630 specification: **(3.8 + L/100 mm) µm** (2 positions per standard)
- Specification for any other position: **(5.5 + L/50 mm) µm** (which can be verified with the Ruby|plate)
- Accuracy of True|position spec can be increased to VDI spec by simple and fast automated Easy|calib with just a few minutes: **(3.8 + L/100 mm) µm** at any position

Improved measurement accuracy with True|position



Without True|position

- Specification only available at predefined position
- Up to 15 µm length measurement error at other positions

With True|position

- Specification available at all positions
- Length measurement error < (5.5 + L/50 mm) µm

Find the right machine for your CT inspection needs.

Waygate Technologies provides an extremely wide product solution range to meet your 3D metrology or failure analysis needs.

Precision line

Inspect with greater speed and accuracy than ever before with our CT precision line, the most powerful X-ray microfocus CT systems for NDT and 3D metrology and analysis.

Production line

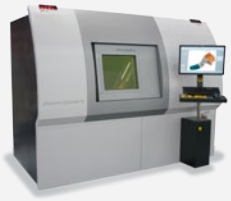
With our CT production line, you can increase scanning speed without compromising image quality and bring 3D inspection right to the production floor.

Research & Development, Quality and Metrology

Parts and Manufacturing

Nanotom M

V|tome|x S240



V|tome|x M300

V|tome|x L300 L450

Application	Composites, plastics, electronics, bio, geo, metrology	Composites, plastics, AM, small castings	AM, castings, composites, electronics, metrology	AM, castings, composites, bio, geo, metrology	
Advantages	high resolution nanoCT®	Price / performance ratio	Versatile premium precision	Maximum flexiblilty	
Max. CT scan size (h x Ø)	250 x 240 mm	420 x 400 mm	400 x 420 mm	600 x 900 mm	1250 x 1300 mm
Max. Sample weight kg / lbs	3 kg / 6.6 lbs	10 kg / 22 lbs	50 kg / 110 lbs	50 kg / 110 lbs	100 kg / 220 lbs
Max. Detail detectability	0.2 µm	1 µm / 0.2 µm nanoCT®	1 µm / 0.2 µm nanoCT®	0.2 µm	1 µm

V|tome|x M300

V|tome|x C450

Speed|scan HD

Speed|scan CT64

Automate to accelerate

These high-volume production systems can come with optional automated robot loading. Paired with other optional features to bring down your scan time. Those systems allow up to 100% CT inspection on the production floor, e.g. in Additive or Battery manufacturing.

Parts and Manufacturing

Speed|scan HD

V|tome|x C450

Speed|scan CT64

X|cube 160|225|320

Application	batteries, connectors, complex assemblies, injection moldings	Large castings, AM, composites, metrology	Large castings, composites, drilling cores	AM + castings 2D inspection	
Advantages	Up to 100% inspection (inline or atline)	Powerful, highly automated	Highest throughput	Highly automated, opt. CT	
Max. CT scan size (h x Ø)	200 x 150 mm	500 x 1000 mm	900 x 500 mm	300 x 300 mm mit 16" DDA	
Max. Sample weight kg / lbs	5 kg / 11 lbs	50 kg / 110 lbs	50 kg / 110 lbs	100 kg / 220 lbs	300 kg / 660 lbs
Max. Detail detectability	20 µm	25 µm	300 µm	25 µm	

Product finder.

Optimal system solutions for your application

	Nanotom M	V|tome|x S240	V|tome|x M300	V|tome|x C450	V|tome|x L300	V|tome|x L450	Speed|scan HD	Speed|scan CT64
Applications								
Small plastics moldings & AM parts	●	●	●				●	
Large plastics moldings & AM parts			●	●	●	●		●
Complex composites	●	●	●	●	●	●		
Large composites			●	●	●	●		●
Small light metal castings / AM parts		●	●		●		●	
Large light metal castings / AM parts			●	●	●	●		●
Small steel castings / AM parts	●		●	●	●			
Large steel castings / AM parts				●		●		
Battery cells	●	●	●				●	
Battery assemblies				●		●		
Semiconductor	●	●	●					
PCBA / Electronics / Sensors	●	●	●				●	
Science /R&D / Cultural / Exploration	●	●	●		●	●		
Precision Metrology: Small parts	●	●	●					
Precision Metrology: Medium parts		●	●		●			
Precision Metrology: Large parts				●	●	●		
Industries								
Automotive	●	●	●	●	●	●	●	●
Aerospace	●	●	●	●	●	●		
Electronics	●	●	●		●		●	
Additive Manufacturing			●	●	●	●	●	
Foundry		●	●	●	●	●		●
Power / Oil & Gas				●		●		
Medical / Dental	●	●	●					
Academia	●	●	●		●	●		
Inspection Mode								
Laboratory	●	●	●	●	●	●		
Atline			●	●			●	●
Inline			●	●			●	●

Customized CT solutions.

Unique feature configuration options

	Nanotom M	V|tome|x S240	V|tome|x M300	V|tome|x C450	V|tome|x L300	V|tome|x L450	Speed|scan HD
Image Optimization							
Scatter|correct			●	●	●	●	
ASC|filter			●	●	●	●	
Dynamic 41|100			●	●	●	●	●
Dynamic 41|200			●	●	●	●	●
Offset|CT		●	●	●	●	●	
Helix|CT	●	●	●	●	●	●	
High-flux|target		●	●		●	●	
Multi|bhc	●	●	●	●	●	●	●
X-ray tube [kV]	180	240	300	450	300	450	240
Dual|tube option [kV]		180	180		180	300	
Diamond|window	●	●	●		●		
Flash!Filters™	●	●	●	●	●	●	●
Automation							
Sample|changer			●				●
Filter|changer			●	●			●
collaborative robot			●				
robot loading			●	●	●	●	●
Quick-pick manipulator				●			
inlineCT option				●			●
Metrology							
direct measuring system	●		●	●	●	●	
temp. stabilized cabinet	●		●	●	●	●	
Easy|calib	●	●		●	●	●	●
Calibration|object	●	●		●	●	●	●
Ruby|plate			●				
True|position			●				
VDI 2630 specified			●	●			

Besides its cone-beam CT systems range, Waygate Technologies also offers its Speed|scan CT64 system for high throughput large composite and light metal casting inspection. Since this system operates with rotating gantry fan beam CT technology, the cone beam CT innovations listed above do not apply.

By making the invisible visible, we ensure safety, quality and productivity.

Our innovative Phoenix CT solutions are designed to increase throughputs without compromising quality. From producing higher resolution scans at higher speeds with our precision line, to bringing inspection to the production floor with our production line, we are committed to helping your operation become more efficient than ever before.

Waygate Technologies - formerly GE Inspection Technologies - has been awarded by Frost & Sullivan in its latest industrial CT research studies 2016 as **Industrial Technology Leader** and 2019 as **Industrial CT Market Leader**.

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